Dos and Don'ts of Scientific Paper Writing

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Dos List

- If you don't have much experience with writing a scientific paper, or you haven't yet developed a writing style of your own, the most efficient way of starting is pick up a paper that you like and emulate the organization and style of that paper.

- Paper writing is story telling. That is, you need to tell a story backed up by your results. Simply list what you have done doesn't tell a story - it must have both a skeleton and flesh. You need to tell your own story, putting it in the historical context (i.e. the literature), describing what you have done that others haven't, and explaining the importance of your results.

- The clear logic is of paramount importance for paper writing. Writing a paper is to argue for a case - your case for why the paper should be published. There is no room for sloppy logic, holes here and there, missing pieces, or irrelevant material.

- Say it explicitly if you have done or thought of something. Given widespread practice of hiding weaknesses under the rug, you are unlikely granted the benefit of doubt if there is room for guessing.

- To balance your critique of the literature, always keep the people you criticize in mind and ask the question of whether they will find your criticisms justified. After all, they are most likely going to be the judges for your paper.

- Pay attention to details. Writing a paper is like a carpenter making a piece of furniture. The details will not escape the attention of the reader/buyer. Here are some details to keep in mind:

    - Minimize spelling, grammatical, and stylistic errors. Such errors inevitably distract the reader from attending to your story and irritate him. Here are some tips.

        1. Spelling errors can be eliminated by a word processor; make sure to use it before your draft is read by anyone else.
        2. Many grammatical errors can also be spotted by a word processor. But grammar checker isn't as effective as a spell checker because of the extreme flexibility of

language and the fact that what's correct isn't always unambiguous.
3. For style, I recommend *The Chicago Manual of Style* (14th ed., by the Univ. of Chicago Press, 1993) as the authoritative source for judging what the correct style is.

- By far, the most errors I have encountered from my students concern word/phrase use, particularly for nonnative English speakers. Many grammatically correct sentences simply don't make sense. Should one use "alone", "lonely" or "lone" in a particular sentence? Should one use an article, and if yes which of "a", "an" or "the"? There is no magic bullet here, and this is the place where experience matters tremendously. Here are some tips:

  1. Build up your knowledge of correct use from writings of other good writers. By the time you are writing a paper, you must have read many. Learn good usage from well-written articles. This way, you know whether sentences similar to the ones you compose have been used in the literature. Observe and absorb how others express themselves.
  2. For nonnative speakers, it's very easy to compose sentences that reflect their native language. Constantly fight this tendency! Learn to write (and think) in English.
  3. Start slowly, VERY slowly. Question each word and each sentence you use. Has it been used before? Is there an example sentence from a dictionary or an article that is similar (Google can be a good source here)? With experience, you will pick up your speed, and by the time you are fluent you know that you are writing sensible English. This is not a place to be "creative"!
  4. Proof read your write up - once, twice, three times, and so on, until you can't find an error or uncertainty, i.e. it converges. Show to others only then.
  5. I recommend Michael Swan's *Practical English Usage* (2nd ed., by Oxford Univ. Press, 1995, in the lab), which aims at the right level in my opinion and thus very useful, particularly for nonnative speakers.

- Though you can't guarantee that every sentence in your paper is true, you must guarantee that it's not false at the time. Ask yourself whether sentences in your paper are quotable out of their contexts.

- Consistency is the overarching rule. When you are uncertain about something and decide to go for one particular option, stick to it throughout. This way, your logic is still clear, and it'd be a lot easier to correct if the option is found wrong later.

- On the use of tense. Different writers have different preferences, but I prefer the present tense for the main of the paper, and use the past tense only when describing an action that clearly happened in the past. For example, *Smith proposed a model in 1982.* There is also a paradoxical, but common use of mixed tenses in scientific writing as in the following example: *Smith proved that X is true.* Presumably the clause describes something that still holds.

- Use active sentences, rather than passive sentences, as default.

Don'ts List

- Don't assume that the reader will do the work for you, to figure out what you mean, to put your results in the context, or to infer the importance of your work, etc. A typical reader is simply too busy and too overwhelmed with ever accelerating literature, and your paper is just one of many hundreds/thousands published each year in the field. As a result, it is usually considered the author's problem if the reader doesn't get it.

- Don't assume that the referee is sympathetic to you; he is a critic by definition. His job is to scrutinize and find faults in your paper. The more he finds the more likely he'll recommend rejection. Don't assume that the reader is sympathetic to you. A typical reader is a skeptic, and he needs to be convinced.

- Don't lose the reader after he reads your title; make it interesting and to the point. Don't lose the reader after he reads your abstract; make it interesting and to the point. Persuade the reader to buy your story after he reads your entire paper.

- Don't publish for the sake of publishing. Though getting through the review process and having a paper in print is an accomplishment, writing a paper is for others to read it and get your story sold. Hence, always put yourself in the shoes of a reader.

- Don't copy any part of a published paper, not even your own paper! If you need, quote from the literature and give exact citation. If part of a previous paper describes precisely what you want to say, e.g. when you use something from another paper and need to include a description for completeness, paraphrase. Treat your own paper or a paper of a co-author like any other in the literature.

For Chinese Students Only

- Due to the differences between English and Chinese, I have found that the use of articles is particularly problematic for Chinese students, who tend to under use them and use them wrongly when they do. Here are a few tips:

  1. Generally speaking, an article is needed unless the following noun is an uncountable, or the noun occurs in the plural form without referring to specific individuals of a group.
  2. The definite article "the" is typically needed when the following noun phrase is modified by a prepositional phrase (i.e. "the home of his cousin").